DEPARTMENT OF THE NAVY (DON)
16.3 Small Business Innovation Research (SBIR)
Proposal Submission Instructions

INTRODUCTION

Responsibility for the implementation, administration, and management of the Department of the Navy (DON) SBIR Program is with the Office of Naval Research (ONR). The Director of the DON SBIR Program is Mr. Robert Smith, robert.l.smith6@navy.mil. For program and administrative questions, please contact the Program Managers listed in Table 1; **do not** contact them for technical questions. For technical questions about the topic, contact the Topic Authors listed for each topic during the period **26 August 2016 through 25 September 2016.** Beginning **26 September 2016**, the SBIR/STTR Interactive Technical Information System (SITIS) (https://sbir.defensebusiness.org/) listed in Section 4.15.d of the DoD SBIR Program Announcement must be used for any technical inquiry. For inquiries or problems with electronic submission, contact the DoD SBIR/STTR Help Desk at 1-800-348-0787 (9:00 a.m. to 6:00 p.m. ET).

TABLE 1: DON SYSTEMS COMMANDS (SYSCOM) SBIR PROGRAM MANAGERS

Topic Numbers	Point of Contact	Activity	Email
N163-137	Mr. Daniel Zarate	NAVFAC	daniel.zarate@navy.mil
N163-138 to N163-139	Mr. Shadi Azoum	SPAWAR	shadi.azoum@navy.mil
N163-140	Mr. Mark Hrbacek	SSP	mark.hrbacek@ssp.navy.mil

The DON's SBIR Program is a mission oriented program that integrates the needs and requirements of the DON's Fleet through R&D topics that have dual-use potential, but primarily address the needs of the DON. Companies are encouraged to address the manufacturing needs of the defense sector in their proposals. Information on the DON SBIR Program can be found on the DON SBIR/STTR website at www.navysbir.com. Additional information pertaining to the DON's mission can be obtained from the DON website at www.navy.mil.

PHASE I GUIDELINES

Follow the instructions in the DoD SBIR Program Announcement at https://sbir.defensebusiness.org/ for program requirements and proposal submission guidelines. Please keep in mind that Phase I should address the feasibility of a solution to the topic. It is highly recommended that proposers follow the DON proposal template located at www.navysbir.com/submission.htm as a guide for structuring proposals. Inclusion of cost estimates for travel to the sponsoring SYSCOM's facility for one day of meetings is recommended for all proposals.

DON SBIR PHASE I PROPOSAL SUBMISSION REQUIREMENTS

The following MUST BE MET or the proposal will be deemed noncompliant and will be REJECTED.

- **Technical Volume.** Technical Volumes shall not exceed **20** pages. The DON requires proposers to include, within the **20-page limit**, an Option that furthers the effort and will bridge the funding gap between the end of the Phase I and the start of the Phase II. Phase I Options are typically

exercised upon selection of the Phase II. Tasks for both the Base and the Option should be clearly identified in the 20-page Technical Volume. Any other information provided (e.g. table of contents, letters of support, references, appendices) will count toward the 20-page limitation.

- **Cost.** The Phase I Base amount shall not exceed $80,000 and the Phase I Option amount shall not exceed $70,000. Costs for the Base and Option should be separate and identified on the Proposal Cover Sheet and in the Cost Volume.

- **Period of Performance**. The Phase I Base and Option Periods of Performance shall not exceed six months each.

DON SBIR PHASE I PROPOSAL SUBMISSION CHECKLIST

- **Proposal Template.** It is highly recommended that proposers follow the DON proposal template located at www.navysbir.com/submission.htm.

- **Subcontractor, Material, and Travel Cost Detail.** In the Cost Volume, firms shall provide sufficient detail for the subcontract, material and travel costs. Use the "Explanatory Material Field" in the DoD Cost Volume worksheet for this information. Material costs should include at a minimum listing of items and cost per item. Travel costs should include at a minimum the purpose of the trip, number of trips, location, length of trip, and number of personnel. When a proposal is selected for award, you must be prepared to submit further documentation to the Component Contracting Officer to substantiate costs (e.g., an explanation of cost estimates for equipment, materials, and consultants or subcontractors).

- **Performance Benchmarks.** Firms must meet the two benchmark requirements for progress towards Commercialization as determined by the Small Business Administration (SBA) on June 1 each year. Please note that DON applies performance benchmarks at time of proposal submission, not at time of contract award.

- **Discretionary Technical Assistance (DTA).** If DTA is proposed, the information required to support DTA should be added in the "Explanatory Material Field" of the DoD Cost Volume worksheet. If proposing DTA, a combined total of up to $5,000 may be added to the Base or Option periods.

DISCRETIONARY TECHNICAL ASSISTANCE (DTA)

The SBIR Policy Directive section 9(b), allows the DON to provide DTA to its awardees to assist in minimizing the technical risks associated with SBIR projects and commercializing products and processes. Firms may request, in their Phase I and Phase II proposals, to contract these services themselves in an amount not to exceed $5,000 per year. This amount is in addition to the award amount for the Phase I or Phase II project.

Phase I awardees that propose more than $150,000 in total funding (Base, Option, and DTA) may not receive a purchase order. Purchase orders are a type of Simplified Acquisition Procedure (SAP) intended to reduce administrative costs, promote efficiency and economy in contracting, and avoid unnecessary burdens for agencies and contractors. The need to issue a Firm Fixed Price (FFP) contract may result in contract delays if the SYSCOM normally issues purchase orders for Phase I awards.

Approval of direct funding for DTA will be evaluated for approval by the DON SBIR office if the firm's proposal (1) clearly identifies the need for assistance (purpose and objective of required assistance), (2) provides details on the provider of the assistance (name and point of contact for performer); and unique skills/specific experience to carry out the assistance proposed, and (3) the cost of the required assistance (costs and hours proposed or other details on arrangement that would justify the proposed expense). This information must be included in the firm's cost proposal specifically identified as "Discretionary Technical Assistance" and cannot be subject to any profit or fee by the requesting SBIR firm. In addition, the provider of the DTA may not be the requesting firm, an affiliate of the requesting firm, an investor of the requesting firm, or a subcontractor or consultant of the requesting firm otherwise required as part of the paid portion of the research effort (e.g. research partner, consultant, tester, or administrative service provider). Failure to include the required information in the proposal will result in the request for DTA being disapproved. If the proposal costs exceed the limits identified for Phase I ($150,000 for the Base plus Option), DTA must be identified and explained in the proposal or the proposal will be REJECTED without evaluation.

If a firm requests and is awarded DTA in a Phase II proposal, it will be eliminated from participating in the DON SBIR/STTR Transition Program (STP), the DON Forum for SBIR/STTR Transition (FST), and any other assistance the DON provides directly to awardees.

All Phase II awardees not receiving funds for DTA in their award must attend a one-day DON STP meeting during the second year of the Phase II. This meeting is typically held in the summer in the Washington, DC area. Information can be obtained at: http://www.navysbir.com/Transition.htm. Awardees will be contacted separately regarding this program. It is recommended that Phase II cost estimates include travel to Washington, DC for this event.

EVALUATION AND SELECTION

The DON will evaluate and select Phase I and Phase II proposals using the evaluation criteria in Sections 6.0 and 8.0 of the DoD SBIR Program Announcement respectively, with technical merit being most important, followed by qualifications of key personnel and commercialization potential of equal importance. Due to limited funding, the DON reserves the right to limit awards under any topic and only proposals considered to be of superior quality will be funded.

Approximately one week after Phase I solicitation closing, e-mail notifications that proposals have been received and processed for evaluation will be sent. Consequently, e-mail addresses on the proposal coversheets must be correct.

Requests for a debrief must be made within 15 calendar days of non-award notification. Please note the DON debrief request period is shorter than the DoD debrief request period specified in section 4.10 of the DoD Instructions

Protests of Phase I and II selections and awards shall be directed to the cognizant Contracting Officer for the DON Topic Number. Contact information for Contracting Officers may be obtained from the DON SYSCOM SBIR Program Managers listed in Table 1.

CONTRACT DELIVERABLES

Contract deliverables for Phase I are typically progress reports and final reports. Data deliverables required by the contract, shall be uploaded to https://www.navysbirprogram.com/navydeliverables/.

AWARD AND FUNDING LIMITATIONS

The DON typically awards a Firm Fixed Price (FFP) contract or a small purchase agreement for Phase I. In accordance with SBIR Policy Directive section 4(b)(5), there is a limit of one sequential Phase II award per firm per topic. Additionally, in accordance with SBIR Policy Directive section 7(i)(1), each award may not exceed the award guidelines (currently $150,000 for Phase I and $1 million for Phase II, excluding DTA) by more than 50% (SBIR/STTR program funds only) without a specific waiver granted by the SBA.

TOPIC AWARD BY OTHER THAN THE SPONSORING AGENCY

Due to specific limitations on the amount of funding and number of awards that may be awarded to a particular firm per topic using SBIR/STTR program funds (see above), Head of Agency Determinations are now required (for all awards related to topics issued in or after the SBIR 13.1/STTR 13A solicitation) before a different agency may make an award using another agency's topic. This limitation does not apply to Phase III funding. Please contact the original sponsoring agency before submitting a Phase II proposal to an agency other than the one that sponsored the original topic. (For DON awardees, this includes other DON SYSCOMs.)

TRANSFER BETWEEN SBIR AND STTR PROGRAMS

Section 4(b)(1)(i) of the SBIR Policy Directive provides that, at the agency's discretion, projects awarded a Phase I under a solicitation for SBIR may transition in Phase II to STTR and vice versa. A firm wishing to transfer from one program to another must contact its designated technical monitor to discuss the reasons for the request and the agency's ability to support the request. The transition may be proposed prior to award or during the performance of the Phase II effort. No transfers will be authorized prior to or during the Phase I award. Agency disapproval of a request to change programs will not be grounds for granting relief from any contractual performance requirement(s) including but not limited to the percentage of effort required to be performed by the small business and the research institution (if applicable). All approved transitions between programs must be noted in the Phase II award or an award modification signed by the contracting officer that indicates the removal or addition of the research institution and the revised percentage of work requirements.

ADDITIONAL NOTES

Due to the short timeframe associated with Phase I of the SBIR process, the DON does not recommend the submission of Phase I proposals that require the use of Human Subjects, Animal Testing, or Recombinant DNA. For example, the ability to obtain Institutional Review Board (IRB) approval for proposals that involve human subjects can take 6-12 months, and that lengthy process can be at odds with the Phase I goal for time to award. Before the DON makes any award that involves an IRB or similar approval requirement, the proposer must demonstrate compliance with relevant regulatory approval requirements that pertain to proposals involving human, animal, or recombinant DNA protocols. It will not impact the DON's evaluation, but requiring IRB approval may delay the start time of the Phase I award and if approvals are not obtained within two months of notification of selection, the decision to award may be terminated. If the use of human, animal, and recombinant DNA use is included under a Phase I or Phase II proposal, please carefully review the requirements at: http://www.onr.navy.mil/About-ONR/compliance-protections/Research-Protections/Human-Subject-Research.aspx. This webpage provides guidance and lists approvals that may be required before contract/work can begin.

Due to the typical lengthy time for approval to obtain Government Furnished Equipment (GFE), it is recommended that GFE is not proposed as part of the Phase I proposal. If GFE is proposed and it is

determined during the proposal evaluation process to be unavailable, proposed GFE may be considered a weakness in the proposal.

For topics indicating ITAR restrictions or the potential for classified work, there are generally limitations placed on disclosure of information involving topics of a classified nature or those involving export control restrictions, which may curtail or preclude the involvement of universities and certain non-profit institutions beyond the basic research level. Small businesses must structure their proposals to clearly identify the work that will be performed that is of a basic research nature and how it can be segregated from work that falls under the classification and export control restrictions. As a result, information must also be provided on how efforts can be performed in later Phases if the university/research institution is the source of critical knowledge, effort, or infrastructure (facilities and equipment).

PHASE II GUIDELINES

All Phase I awardees will be allowed to submit an **Initial** Phase II proposal for evaluation and selection. The Phase I Final Report, Initial Phase II Proposal, and Transition Outbrief (as applicable), will be used to evaluate the offeror's potential to progress to a workable prototype in Phase II and transition technology in Phase III. Details on the due date, content, and submission requirements of the Initial Phase II Proposal will be provided by the awarding SYSCOM either in the Phase I award or by subsequent notification. **NOTE: All SBIR/STTR Phase II awards made on topics from solicitations prior to FY13 will be conducted in accordance with the procedures specified in those solicitations (for all DON topics, this means by invitation only).**

The DON typically awards a cost plus fixed fee contract for Phase II. The Phase II contracts can be structured in a way that allows for increased funding levels based on the project's transition potential. To accelerate the transition of SBIR-funded technologies to Phase III, especially those that lead to Programs of Record and fielded systems, the Commercialization Readiness Program was authorized and created as part of section 5122 of the National Defense Authorization Act of Fiscal Year 2012. The statute set-aside is 1% of the available SBIR funding to be used for administrative support to accelerate transition of SBIR-developed technologies and provide non-financial resources for the firms (e.g. the DON's SBIR/STTR Transition Program).

PHASE III GUIDELINES

A Phase III SBIR award is any work that derives from, extends, or completes effort(s) performed under prior SBIR funding agreements, but is funded by sources other than the SBIR Program. Thus, any contract or grant where the technology is the same as, derived from, or evolved from a Phase I or a Phase II SBIR contract and awarded to the company that was awarded the Phase I/II SBIR is a Phase III SBIR contract. This covers any contract/grant issued as a follow-on Phase III SBIR award or any contract/grant award issued as a result of a competitive process where the awardee was an SBIR firm that developed the technology as a result of a Phase I or Phase II SBIR. The DON will give SBIR Phase III status to any award that falls within the above-mentioned description, which includes assigning SBIR Data Rights to any noncommercial technical data and/or noncommercial computer software delivered in Phase III that was developed under SBIR Phase I/II effort(s). Government prime contractors and/or their subcontractors shall follow the same guidelines as above and ensure that companies operating on behalf of the DON protect the rights of the SBIR company.

NAVY SBIR 16.3 Topic Index

N163-137 TITLE: Novel Pyrrhotite Detection Method in Concrete Aggregate

TECHNOLOGY AREA(S): Materials/Processes, Sensors

ACQUISITION PROGRAM: NAVFAC Secondary Program of Record: Facilities Sustainment, Restoration and Modernization, and NAVFAC Criteria, Non-ACAT

OBJECTIVE: The objective of this SBIR topic is to develop a portable device or test kit for analyzing the presence of "pyrrhotite" in damaged concrete structures, as well as loose aggregate before it is mixed into fresh concrete. The ultimate goal of this technology is the prevention of costly repairs and replacement of concrete structures still in their early life cycle.

DESCRIPTION: The concrete industry is increasingly recognizing the extent of structural damage caused by a deleterious presence of "pyrrhotite" mineral in concrete aggregate. Current diagnostics to detect pyrrhotite require petrographic analysis of samples in a laboratory, a costly and time consuming process. There is a need for development of a novel and portable method for detecting and quantifying the presence of pyrrhotite in aggregate and concrete while in the field.

The Navy is a large consumer of cement and aggregate for its many construction and repair projects of piers, pilings, wharves, runways, and buildings. NAVFAC is responsible for new construction and sustainment of these facilities. This responsibility includes design, construction, maintenance and repair services for all concrete facilities. Additionally, the NAVFAC Criteria Office is responsible for technical adequacy of all Navy shore facilities design, construction and maintenance criteria. Pyrrhotite-related concrete corrosion may be a significant cost factor in Navy facilities sustainment, restoration, and new construction.

The Navy has issued numerous reports and guidance on Alkaline Aggregate Reaction, or AAR, and specifically ASR – Alkaline Silica Reaction in concrete, where "reactive" aggregate containing certain forms of silica combines with alkali hydroxide in the hydrated cement to form an expanding gel that breaks the concrete. NAVFAC's guidance on pavements and marine concrete also mention the importance of limiting sulfate content in concrete. Although the effects of sulfate attacks in concrete have been appreciated for decades, the connection to pyrite and pyrrhotite minerals has only recently (late 1990s onward) been reported and researched in-depth. This may be due to current concrete technologies greatly advancing over the past decades. Today's formulations include a number of ingredients (admixtures) to enhance both the fresh and the hardened concrete's properties. These advanced formulations may contribute to the recent increase in pyrrhotite-related concrete failures.

Pyrrhotite is a naturally occurring iron sulfide mineral in the particular chemical form $Fe(1-x)S$, where $x = 0$ to 0.125. If pyrrhotite is present in the concrete, then water and oxygen, already present in the hydrated cement, will foster a chemical reaction that produces expansive by-products. Numerous recent news reports of pyrrhotite-caused structural damage are emerging from the U.S., Canada, Europe, and other locations around the world, indicating the problem may be much more widespread than previously thought by the construction industry. As a timely example, the mineral has been blamed for widespread foundation cracking in thousands of homes in Quebec, Canada. Officials estimate that 4000+ homes are affected. The Prime Minister has indicated the Quebec Province is spending over $30 Million to mitigate the problem, according to the Canadian Press.

Various remedial measures for pyrrhotite related concrete corrosion have been proposed, but the long term effectiveness of such in-place remediation has not been established. For housing foundations, as an example, the only method of remediation which can guarantee a permanent solution is removal of the pyritiferous material.

A portable device or test kit would be of great benefit for analyzing the presence of pyrrhotite in existing concrete structures suspected of having pyrrhotite-related damage, as well as in aggregate received at the job-site prior to mixing. If successful, this technology would prevent concrete formulations that are "doomed to failure" from being

utilized in the DoD's, and ultimately commercial, myriad of concrete facilities.

GUIDELINES FOR NEW TECHNOLOGY:
1. Capable of operating in an outdoor field environment.
2. Capable of holding calibration for 8+ hours of continuous operation.
3. Device accuracy should provide at least one order of magnitude linearity, and be within ±5% of known values, in a range of 0.1 to 10% by weight pyrrhotite.
4. Capable of consistent, repeatable measurement even with concentration variation over the desired range.
5. Capable of directly reading and/or "swabbing" the aggregate or solid concrete sample.
6. Capable of operation in an expeditionary environment. Such an environment for the military would include a lack of sheltering infrastructure with limited access to a reliable source of electricity and possible intemperate weather. Marine waterfront locations would further suffer from the presence of salt spray. Therefore, minimum environmental goals include operability in:
• Temperatures of -10 to +35-degree Celsius
• Humidity levels of 5 to 95% RH
• Water–proof electronics housing.
7. Sized for portability by one person, i.e. a maximum of 22-lbs for all components.
8. Results provided real-time or near-real-time, with a total cycle time (sampling input to result output) goal of 5-minutes per sample.
9. System availability and reliability of 1000-hours of operation.
10. Minimal external requirements, i.e. kit should include any needed chemicals, compressed air or vacuum source, and include battery operation, in addition to 110-VAC power, if electricity is needed.

PHASE I: Determine feasibility for the development of a novel pyrrhotite detection method for efficacy in a laboratory environment, utilizing known standardized levels of the mineral in both loose aggregate and in formed concrete to assess accuracy. Development of the pyrrhotite detection method must show feasibility for eventual portability and field use.

PHASE II: Based on the results of Phase I, develop and demonstrate a bread-board pyrrhotite detection device with natural aggregate and concrete samples, and compare to independent laboratory analyses provide by the government. Assemble a full scale demo system to validate operation. Demo will be tested at a Navy facility with suspected pyrrhotite-related concrete degradation in order to prove performance.

Phase II Option, if awarded, will be used to advance the design to improve accuracy, reliability, and/or reduced system size.

PHASE III DUAL USE APPLICATIONS: Based on the results of Phase II, the small business will commercialize the device in combination with Navy-relevant concrete construction and repair projects. Private Sector Commercial Potential: The device would have wide application across both military and commercial sectors for checking aggregate lots prior to concrete mixing and for on-site failure / forensic analysis during repair projects.

REFERENCES:
1. Hawkins, Brian A., Implications of Pyrite Oxidation for Engineering Works, Springer International Publishing, Switzerland, 2014.

2. "Mineral to Blame in Cracking Foundations", Durability & Design Magazine, May 11, 2016.

3. Tulis, Ralph H., "Cracked Foundations Need Study by a State Task Force
http://ctviewpoints.org/2015/10/08/cracked-foundations-need-study-by-a-state-task-force/ October 8, 2015.

4. "Feds to Spend $30 Million in Quebec on Mineral Problem", Canadian Press Release, April 2016.
http://globalnews.ca/news/2622979/ottawa-to-spend-30-million-on-helping-quebec-homeowners-who-have-pyrrhotite/

5. “Pyrite Problem – Exploring the Implications of Sulfur in Geological Materials for Civil Engineering”, http://www.pyriteproblem.com

KEYWORDS: pyrrhotite, pyrite, framboid, microcrystal, concrete, sulfate, aggregate, oxidation, sulfide

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Questions may also be submitted through DoD SBIR/STTR SITIS website.

N163-138 TITLE: Analysis Tools for Managing Commercial Off-The-Shelf (COTS) Obsolescence

TECHNOLOGY AREA(S): Information Systems

ACQUISITION PROGRAM: Consolidated Afloat Networks and Enterprise Services (CANES)

OBJECTIVE: Develop a COTS obsolescence advanced planning and decision analysis tool built on an open source framework to automate business decisions and “what if analysis” for the Consolidated Afloat Networks and Enterprise Services (CANES) programs end of life (EOL) and end of support (EOS) components to assist in the obsolescence management strategy.

DESCRIPTION: CANES is the Navy’s only Program of Record to replace existing afloat networks and provide the necessary infrastructure for applications, systems, and services required for Navy to dominate the Cyber Warfare domain.

The fundamental goal of CANES is to provide Infrastructure and Platform as a Service, within which current and future iterations of Navy Tactical Network computing and storage capabilities will reside. CANES will provide complete infrastructure, inclusive of hardware, software, processing, storage, and end user devices for Unclassified, Coalition, Secret and Sensitive Compartmented Information (SCI) for all basic network services (email, web, chat, collaboration) to a wide variety of Navy surface combatants, submarines, Maritime Operations Centers, and Aircraft. In addition, hosted applications and systems, inclusive of Command and Control, Intelligence, Surveillance and Reconnaissance, Information Operations, Logistics and Business domains, require the CANES infrastructure to operate in the tactical environment.

The CANES network has to manage the complexities in scheduling and executing network installations afloat. The specific factors which create uncertainty and complexity are changing ship availabilities, budget limitations, and COTS End Of Life (EOL) or End Of Support (EOS) dates and when logistics buys can be implemented. The tool should be able to ingest relevant data such as, but not limited to, ships availabilities and product EOL dates, and that would assist in putting the information in context for Navy decision makers. The tool should additionally be able to address compatibility issues with other applications and components, Business Case Analysis trade-offs, and provide a recommended schedule for replacement. The ability to ingest these criteria into a tool and manipulate the data to improve visualization of the data, expected impacts and perform rapid “what if” planning would reduce the tedious effort of trying to map this manually.

There are no known commercial alternatives to a decision tool which can accommodate the myriad requirements around the required business processes, fiscal year funding profiles, changing ship availabilities and the COTS obsolescence plans from industry. The Navy is in a unique position of having limited shipboard installation

opportunities which adds significant complexity to the problem set. These complexities include multiple unique configurations per ship platform that each need to be managed and tracked for EOL issues. Additionally, each Navy platform has hundreds of COTS products, each with their own tech refresh cycle and original equipment manufacturer (OEM), resulting in a multi-dimensional problem to manage.

With Cyber Security in mind, the challenge of managing COTS obsolescence is critical due to the threat that unsupported hardware and software poses to Navy networks. As the fielded networks age, the manpower required to track COTS obsolescence is a significant burden on programs. Due to program workloads and prioritization of new capabilities and newer networks, the current difficulties inherent in the manual processes result in not fully considering EOS/EOL when determining the acquisition planning and engineering changes to continue to support and accredit our systems. The product life cycle and well planned windows of engineering design and warfighter deployment are critical elements which dramatically affect the life cycle costs and total ownership cost of the CANES system and other IT systems fielded by the DoD. The current acquisition and sustainment efforts could be greatly improved with an innovative COTS obsolescence management tool that provides decision analysis and trade-offs associated with engineering design and deployment of COTS products. This becomes especially critical when combined with the limited windows of availability for installs due to high tempo operations. A COTS obsolescence decision analysis tool would enable the Navy and DoD to better manage technology refresh cycles and obsolescence in today's high cyber threat environment.

PHASE I: The small business will define and develop a concept for an open source-based business analysis and decision tool to track COTS obsolescence and ingest externally available data such as ships availability schedules and ship configurations. The concept should include the ability to visualize the data in different human readable forms that enable the acquisition manager to make optimal acquisition and engineering decisions (cost, schedule, and performance). This capability would initially apply to CANES with the ultimate goal of applying to other DoD Command, Control, Communications, Computers, and Intelligence (C4I) programs. CANES may provide a relevant Build of Materials of representative equipment for the Small business to populate and understand the requirement. Small business will not have access to CANES for Phase I.

PHASE II: Based on the results of the Phase I effort and the Phase II Statement of Work (SOW), the small business will develop a beta software release and a prototype solution to demonstrate their capabilities. The analysis and decision tool to track COTS obsolescence prototype will be evaluated to determine its capabilities and benefits in meeting the performance goals defined in the Phase II SOW and in assisting the business decision and planning processes which are currently manually implemented. The software will be evaluated with examples of products going EOL/EOS and how that information is visualized within the products. Phase II testing will be representative of components going end of life/end of support and the tools ability to track and visualize this information.

PHASE III DUAL USE APPLICATIONS: The small business will be expected to support the Navy in transitioning the software product for Navy use on the CANES program as well as update support for the open source frameworks and data sources utilized. The company will finalize the design and deliver the software, according to the Phase III SOW, for evaluation to determine its effectiveness by the CANES Program and the CANES Systems Engineering Team. The company will support the Navy for test and evaluation in accordance with the SBIR Phase II SOW. Following testing and validation, the end design is expected to produce results outperforming the current CANES business processes and ad hoc methods in use today. Private Sector Commercial Potential: The software system described in this SBIR topic paper could have private sector commercial potential for any IT business which needs to determine optimal upgrade schedules to accommodate the IT obsolescence of their fielded network components.

REFERENCES:

1. http://www.dmea.osd.mil/ob.html describes the obsolescence problem that this SBIR topic paper is focused on resolving.

2. Diminishing Manufacturing Sources and Material Shortages (DMSMS) ACQUISITION GUIDELINES: Implementing Parts Obsolescence Management Contractual Requirements Rev 3.0 (2001). http://www.dmea.osd.mil/docs/acquisition_guidelines.pdf

KEYWORDS: CANES, COTS, Cyber Security, Obsolescence, SBIR, Transition, DMSMS

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Questions may also be submitted through DoD SBIR/STTR SITIS website.

N163-139 TITLE: Shipboard 'Non-Emitting' Target Imaging and Identification System

TECHNOLOGY AREA(S): Battlespace, Sensors

ACQUISITION PROGRAM: PMW 120 Information Operations / Intelligence Surveillance Reconnaissance Programs of Record

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), 22 CFR Parts 120-130, which controls the export and import of defense-related material and services, including export of sensitive technical data, or the Export Administration Regulation (EAR), 15 CFR Parts 730-774, which controls dual use items. Offerors must disclose any proposed use of foreign nationals (FNs), their country(ies) of origin, the type of visa or work permit possessed, and the statement of work (SOW) tasks intended for accomplishment by the FN(s) in accordance with section 5.4.c.(8) of the solicitation. Offerors are advised foreign nationals proposed to perform on this topic may be restricted due to the technical data under US Export Control Laws.

OBJECTIVE: Develop a compact system capable of identifying non-RF emitting targets at long range in both day/night operations from a ship-based platform. Ranges of interest are >150NM for airborne targets and >25NM for targets operating at or near the ocean surface. Desired target resolution should be approximately 10cm to support target identification.

DESCRIPTION: Maritime non-RF emitting targets are notoriously difficult to identify with sufficient resolution to allow for identification, even in clear weather conditions. While many commercial Electro-Optical / Infra-Red (EO/IR) devices are available, none readily address military requirements for 'positive identification' of small watercraft, Unmanned Arial Vehicles (UAV), and the proliferating variety of small form factor autonomous systems. Small boats are particularly problematic due to the necessity to differentiate and identify civilian craft ("White Shipping") from military, state sponsored Intelligence, Surveillance, Reconnaissance (ISR) craft, terrorist, criminal and other waterborne threats and vessels of interest. In addition, gliding missiles that do not emit a thrust signature are of grave concern.

This topic seeks innovative research leading to the development of a ship-based long-range day / night imaging system, able to provide sufficiently high resolution at range to allow for identification of non-RF emitting sea and air borne targets operating in clear weather conditions. The resolutions required for this system may necessitate large apertures to contend with atmospheric effects; e.g. blurring, warping, scintillation, attenuation and/or multi-path clutter, but any solution offered must be feasible to operate in a typical navy combatant environment; e.g., Littoral Combat Ship, (LCS) Guided Missile Destroyer (DDG), Aircraft Carrier (CVN), etc.

Applicable systems may employ any number of technologies; e.g. optical, radio-frequency, infra-red, etc., but must address the particular technological risks for the technique selected.

Any solution offered must be feasible to operate in a typical shipboard environment. Maximum volume goal for

transmit / receive system equipment should be no more than 0.75m cubed, where support electronics may be off boarded. On board Size Weight and Power (SWaP) constraints must adhere to current power, cooling, installation, etc. requirements for use aboard navy ships, specifically 3 phase 120 volt, 60 Hz power. Unit offered can also be portable / battery powered. Solutions requiring chill water cooling / higher voltage requirements are discouraged, but will be considered. Non-RF emitter systems must address the risks with optical, infra-red, millimeter wave power requirements at long range, resolution requirements, and atmospheric blurring, warping, scintillation etc. effects. Proposed systems must fit the SWaP constraints for the total system.'

Work produced in Phase II may become classified. Note: The prospective contractor(s) must be U.S. owned and operated with no foreign influence as defined by DoD 5220.22-M, National Industrial Security Program Operating Manual, unless acceptable mitigating procedures can and have been implemented and approved by the Defense Security Service (DSS). The selected contractor and/or subcontractor must be able to acquire and maintain a secret level facility and Personnel Security Clearances, in order to perform on advanced phases of this project as set forth by DSS and SPAWAR in order to gain access to classified information pertaining to the national defense of the United States and its allies; this will be an inherent requirement. The selected company will be required to safeguard classified material IAW DoD 5220.22-M during the advanced phases of this contract.

PHASE I: Perform design analysis to identify non-RF emitting 'dark targets' at the resolutions and ranges specified above. The effort will address how the recommended system will mitigate degrading effects inherent to the system chosen. The Phase I deliverables include a preliminary design recommendation and a final report.

PHASE II: Fabricate a demonstration prototype of the Phase I recommended system. The products of Phase II should include the tested prototype hardware system (including the software), where testing will involve the prototype image / identification of both cooperative and non-cooperative targets in a Navy furnished facility using Navy furnished data where required. The selected vendor will also provide a prototype test report and a final report.

PHASE III DUAL USE APPLICATIONS: Develop a plan to: 1.) fabricate a single technology demonstrator unit, 2.) create a multi-unit (> 100) manufacturing process and, 3.) develop a marketing plan for the production ready system. Carry out the necessary engineering, system integration, packaging, and testing to field a robust, reliable system. Assist transition of technology to industry for marketing to defense community. Private Sector Commercial Potential: The private sector potential could be significant and, as was true for Global Positioning System (GPS), difficult to fully bound or quantify. The ability to resolve objects at distance in small form factors has potential applications in multiple domain areas: e.g., law enforcement, environmental / zoological science, entertainment industry, recreation use, etc.

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2. E. L. Cuellar, James Stapp, and Justin Cooper, "Laboratory and Field Experimental Demonstration of a Fourier Telescopy Imaging System," Proc. SPIE 5896, Unconventional Imaging, 58960D, (September 01, 2005).

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KEYWORDS: Dark targets; Passive targets; Non-RF emitting targets; Target imaging and identification; High resolution imaging and identification; RADAR systems; Advanced optical systems; EM Emission / Absorption spectroscopy and image identification.

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Questions may also be submitted through DoD SBIR/STTR SITIS website.

N163-140 TITLE: Curved (Convex) Surface Global Positioning System (GPS) Antenna Design for Submarine Launched Ballistic Missile (SLBM) Trident D5 Flight Test Reentry Bodies

TECHNOLOGY AREA(S): Electronics

ACQUISITION PROGRAM: Strategic Weapons Systems ACAT IC

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), 22 CFR Parts 120-130, which controls the export and import of defense-related material and services, including export of sensitive technical data, or the Export Administration Regulation (EAR), 15 CFR Parts 730-774, which controls dual use items. Offerors must disclose any proposed use of foreign nationals (FNs), their country(ies) of origin, the type of visa or work permit possessed, and the statement of work (SOW) tasks intended for accomplishment by the FN(s) in accordance with section 5.4.c.(8) of the solicitation. Offerors are advised foreign nationals proposed to perform on this topic may be restricted due to the technical data under US Export Control Laws.

OBJECTIVE: Development of a GPS antenna design and computing algorithm required to acquire GPS on a reentry body during flight.

DESCRIPTION: Navy reentry flight test bodies have the capability to capture GPS data during flight. Currently a flat plate is used in order to mount the antenna and simplify the design. To be more representative of an actual reentry body, which has a rounded surface, using a rounded cover for a flight test body is desired. This would allow the use of GPS receivers in additional test bodies and could reduce the effort used to recreate a trajectory after flight. Because of the rounded surface, using commercial antennas does not appear to be feasible. Antenna design must accommodate both the L1 and L2 GPS frequencies and must accommodate both the C/A and P(Y) codes (relates to the bandwidth).

PHASE I: Determine and demonstrate feasibility for the development of a GPS antenna distribution that can be used on a rounded convex surface with a stay out zone in the center. Development should include a theoretical analysis/modeling of the antenna phase and gain patterns. Expect that the results from pattern modeling will be compared to measured gain and phase data gather in Phase II. Include any relevant processing (algorithm) software design for the GPS receiver that supports operation with this antenna design.

PHASE II: Fabricate and test prototype GPS antenna patterns. For this effort the design drawings will be coordinated through Navy Strategic Systems Program. During Phase II, it would be advantageous to partner with Lockheed Martin Space Systems Company (Sunnyvale, CA) to fabricate a complete aft closure containing the GPS antennas and for measurement of the resultant aft closure gain and phase pattern. It would also be advantageous to partner with Charles Stark Draper Laboratory (Cambridge, MA) for incorporation of antenna phase and gain patterns into Draper's Hardware in the Loop (HWIL) to simulate reentry flight environments. Any debugging should be performed by the SBIR contractor.

PHASE III DUAL USE APPLICATIONS: Assuming successful demonstration in HWIL environments, two flight test units will be fabricated and flown on a flight test body via Extended Navy Test Bed (ENTB). Phase III will require the proofing of the algorithms and will also include the post flight processing of the data. The GPS data will be processed by the SBIR contractor and compared to the Small Reentry Inertial Measurement Unit (SRIMU) data that is generated by the on board IMU and verify that the algorithms provided an accurate position. The small business will assist the Navy with implementation of the final design GPS antenna onto appropriate flight test bodies. Private Sector Commercial Potential: Depending on the flexibility in the algorithms utilized this could be expanded for use on other convex surfaces, such as helmets, car roofs.

REFERENCES:

1. Balanis, Constantine, "Antenna Theory: Analysis and Design", 3rd Edition

2. Regan, Frank, Anandakrishnan, Satya, "Dynamics of Atmospheric Re-Entry", American Institute of Aeronautics and Astronautics, Inc. Washington DC, 1993

KEYWORDS: GPS, antenna, curved surface, antenna phase patterns, antenna gain, reentry body

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